

# Attention for alcohol : on the changeability of appetitive motivational processes in alcohol abuse

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## Abstract PhD Thesis

### ATTENTION FOR ALCOHOL

On the changeability of appetitive motivational processes in alcohol abuse.

Tim Schoenmakers

Recent models of addiction distinguish between two types of cognition that influence substance use and abuse: explicit and implicit cognitions. These cognitions influence appetitive motivation, which is the drive to approach and pursue appetitive substances such as drugs and alcohol. Explicit cognitions can be measured with questionnaires; roughly stated, these are reports of feelings or thoughts, such as beliefs about the reasons for using an addictive substance (“Does drinking alcohol reduce your worries?”), or one’s present state (“How much do you crave alcohol right now?”). Implicit cognitive processes are often measured with reaction time tasks. They are not always accessible to peoples’ awareness, may operate automatically, and are difficult to control. Central to this thesis is the implicit process ‘attentional bias’, defined as an excessive selective attention for substance-related cues. This selective attention is related to the maintenance and development of addictive behaviours.

In general, the thesis deals with changing implicit processes that underlie the appetitive motivation for substance use and abuse. More specifically, the first studies of the thesis (Chapters 2 and 3) were aimed at broadening the knowledge on the effects of alcohol consumption (i.e. alcohol prime dose effects) on various aspects of appetitive motivation: attentional bias, eye movements, approach bias and craving. The second line of research (see Chapters 4 and 5) focused on a training method to decrease attentional bias and related clinical factors.

In the study described in Chapter 2, we found that the maintenance of attention, the gaze dwell time and number of first eye movements toward alcohol-related stimuli were all increased after consumption of a low dose of alcohol compared to after a placebo drink. This alcohol dose was adjusted for body weight and was equal to three Dutch standard units of alcohol for someone weighing 80 kg. Unexpectedly, there was no larger approach bias after the low alcohol dose. We did, however, measure an increase in subjective craving after alcohol that was not found after a placebo drink. Overall, this suggests an increase in appetitive motivation for alcohol after a low prime dose of alcohol. Additionally, attentional bias and approach bias were correlated much higher after the prime dose than after the placebo. Possibly, the latter finding is caused by decreased inhibitory control over automatic processes after alcohol consumption. When implicit appetitive tendencies are not affected by effortful control they might better reflect their mutual underlying construct, appetitive motivation.

In a second study on alcohol prime effects (Chapter 3), we measured appetitive motivational constructs following alcohol consumption in a real-life setting. Lab studies had shown changes in craving and attentional bias after prime doses. However, no research had been conducted that tested whether these effects could also be measured in a real-life setting, and to what extent these changes relate to alcohol-consumption levels in real-life. We tested an opportunistic sample of social drinkers in a pub. Controlling for usual drinking behaviour, we found increases in craving up to very high alcohol doses. We did not find

a significant relation between attentional bias and alcohol consumption in participants who had been drinking less than a binge at the time of testing (less than 6 drinks for males, less than 5 drinks for females). However, for people who had been bingeing attentional bias was negatively correlated with the amount of alcohol consumed. The results indicate that different aspects of appetitive motivation respond differently to alcohol priming and subsequently, they might affect alcohol consumption in a different way.

The second line of research of this thesis focused on a training method to decrease attentional bias. If proved to be effective, such a method might eventually be used as a clinical tool. In this computerized training, participants are trained to avoid alcohol-related stimuli; it is therefore also called 'avoid-attention modification training' (avoid-AMT). In a first study in the lab with male heavy drinkers (Chapter 4), attentional bias decreased after the avoid-AMT, but only for the specific stimuli that were used in the training. There were no effects on untrained stimuli and no effects on a second measure of attentional bias. Also, craving and drink preference were not affected by the training. Thus our first avoid-AMT did not reveal clinically relevant effects, nor did it show evidence for a causal relation between attentional bias and craving - as would have been the case when the manipulation/training of attentional bias had resulted in a contingent craving effect.

We figured that by increasing the intensity of the avoid-AMT (by increasing the number of training stimuli and sessions, and by motivating participants to perform better), a stronger effect may be obtained. In the second avoid-AMT study (Chapter 5), we trained alcoholic patients of three clinics in five sessions. This intervention was successful in decreasing attentional bias for trained and untrained stimuli, indicating that attention for the complete category of alcohol-related stimuli had been changed. Patients reported little craving at all at pre-test which might explain why we did not find decreased craving after the intervention. In the clinic with the shortest regular treatment program, patients in the avoid-AMT group were much sooner discharged than patients in the control group, suggesting that the training had a positive effect on the regular treatment program that was mainly focused on cognitive behavioural therapy. Finally, of the few patients who relapsed after the treatment program, patients in the re-training group relapsed at a later time than patients of the control group, indicating that the training had a positive effect on time to relapse.

In the general discussion of this thesis (Chapter 6), I have reviewed avoid-AMT studies that had been published at the time of writing. At the end of the review I have proposed a model to explain clinical effects of avoid-AMT. The model predicts that the effect of avoid-AMT on attentional bias is influenced by increased control over attention for substance-related cues, general attentional functioning, or both. Selective avoidance of / disengagement from substance-related cues is initially a controlled process. Later on, after repeated practice, this avoidance might become automated. The crucial effect of decreased attentional bias after an avoid-AMT intervention is the decrease in vulnerability for addiction-related cues. Interventions such as the avoid-AMT or perhaps more general attentional control exercises could be administered to increase control over implicit addiction-related processes and perhaps to decrease their detrimental effects on behaviour enduringly.